AMENDMENTS TO THE CLAIMS

1. (Previously presented) A gel matrix comprising gel comprising pores having a size to sieve molecules of a desired size range by electrophoresis and one or more SERS-enhancing nanoparticles stationary within the gel,

wherein the gel matrix has a thickness sufficient to perform electrophoresis.

2. (Original) The gel matrix of claim 1 comprising a plurality of the nanoparticles to provide a plurality of unique optical signatures.

3. (Original) The gel matrix of claim 2, wherein the SERS-enhancing nanoparticles comprise one or more Raman-active tags independently selected from the group consisting of nucleic acids, nucleotides, nucleotide analogs, base analogs, fluorescent dyes, peptides, amino acids, modified amino acids, organic moieties, quantum dots, carbon nanotubes, fullerenes, metal nanoparticles, electron dense particles and crystalline particles.

4. (Original) The gel matrix of claim 1, wherein at least one of the nanoparticles has a net charge.

5. (Original) The gel matrix of claim 1, wherein the nanoparticles each provide a unique SERS-signal that is correlated with binding specificity of the probe of the nanoparticle.

6. (Original) The gel matrix of claim 1, wherein the Raman-active tag comprises adenine or an analog thereof.

7.-9. (Canceled)

10. (Original) The gel matrix of claim 1, wherein the probe is selected from the antibodies, antigens, polynucleotides, oligonucleotides, receptors and ligands.

11. (Original) The gel matrix of claim 10, wherein the probe comprises a polynucleotide.

12. (Previously presented) The gel matrix of claim 1, wherein any of the nanoparticles may further comprise a fluorescent label that contributes to the optical signature.

13.–32.(Canceled)

33. (Previously presented) A system for detecting an analyte in a sample comprising a gel matrix comprising electrophoresis gel comprising pores having a size to sieve molecule of a desired size range by electrophoresis and one or more SERS-enhancing nanoparticles stationary within the electrophoresis gel, the SERS-enhancing nanoparticles within the electrophoresis gel having an attached probe that binds specifically to an analyte; a sample containing at least one analyte; and

an optical detection system suitable for detecting SERS signals from the nanoparticles, wherein the gel matrix is thick enough to perform electrophoresis.

34. (Original) The system of claim 33, further comprising a computer comprising an algorithm for analysis of the SERS signals obtained from the sample.

35.–93.(Canceled)

94. (Previously presented) The gel matrix of claim 1, wherein the SERS-enhancing nanoparticles within the electrophoresis gel have an attached probe that binds specifically to an analyte.

95. (Currently amended) A gel matrix comprising a magnetophoresis gel comprising pores having a size to sieve molecules of a desired size range by magnetophoresis and one or more SERS-enhancing nanoparticles stationary within the magnetophoresis gel,

wherein the gel matrix has a thickness sufficient to perform ~~electrophoresis~~ magnetophoresis.

96. (Currently amended) A system for detecting an analyte in a sample comprising a gel matrix comprising a magnetophoresis gel comprising pores having a size to sieve molecule of a desired size range by electrophoresis or magnetophoresis and one or more SERS-enhancing nanoparticles stationary within the ~~magnetophoresis~~ magnetophoresis gel, the SERS-enhancing nanoparticles within the magnetophoresis gel having an attached probe that binds specifically to an analyte; a sample containing at least one analyte; and

an optical detection system suitable for detecting SERS signals from the nanoparticles, wherein the gel matrix is thick enough to perform magnetophoresis.

97. (Currently amended) The ~~gel matrix~~ system of claim 33 comprising a plurality of the nanoparticles to provide a plurality of unique optical signatures.

98. (Currently amended) The ~~gel matrix~~ system of claim 97, wherein the SERS-enhancing nanoparticles comprise one or more Raman-active tags independently selected from the group consisting of nucleic acids, nucleotides, nucleotide analogs, base analogs, fluorescent dyes, peptides, amino acids, modified amino acids, organic moieties, quantum dots, carbon nanotubes, fullerenes, metal nanoparticles, electron dense particles and crystalline particles.

99. (Currently amended) The ~~gel matrix~~ system of claim 33, wherein at least one of the nanoparticles has a net charge.

100. (Currently amended) The ~~gel matrix~~ system of claim 33, wherein the nanoparticles each provide a unique SERS-signal that is correlated with binding specificity of the probe of the nanoparticle.

101. (Currently amended) The ~~gel matrix~~ system of claim 33, wherein the Raman-active tag comprises adenine or an analog thereof.

102. (Currently amended) The ~~gel matrix~~system of claim 33, wherein the probe is selected from antibodies, antigens, polynucleotides, oligonucleotides, receptors and ligands.

103. (Currently amended) The ~~gel matrix~~system of claim 102, wherein the probe comprises a polynucleotide.

104. (Previously presented) The gel matrix of claim 33, wherein any of the nanoparticles may further comprise a fluorescent label that contributes to the optical signature.

105. (Previously presented) The gel matrix of claim 95 comprising a plurality of the nanoparticles to provide a plurality of unique optical signatures.

106. (Previously presented) The gel matrix of claim 105, wherein the SERS-enhancing nanoparticles comprise one or more Raman-active tags independently selected from the group consisting of nucleic acids, nucleotides, nucleotide analogs, base analogs, fluorescent dyes,

peptides, amino acids, modified amino acids, organic moieties, quantum dots, carbon nanotubes, fullerenes, metal nanoparticles, electron dense particles and crystalline particles.

107. (Previously presented) The gel matrix of claim 95, wherein at least one of the nanoparticles has a net charge.

108. (Previously presented) The gel matrix of claim 95, wherein the nanoparticles each provide a unique SERS-signal that is correlated with binding specificity of the probe of the nanoparticle.

109. (Previously presented) The gel matrix of claim 95, wherein the Raman-active tag comprises adenine or an analog thereof.

110. (Previously presented) The gel matrix of claim 95, wherein the probe is selected from antibodies, antigens, polynucleotides, oligonucleotides, receptors and ligands.

111. (Previously presented) The gel matrix of claim 110, wherein the probe comprises a polynucleotide.

112. (Previously presented) The gel matrix of claim 95 wherein any of the nanoparticles may further comprise a fluorescent label that contributes to the optical signatures.

113. (Currently amended) The ~~gel matrix~~system of claim 96 comprising a plurality of the nanoparticles to provide a plurality of unique optical signatures.

114. (Currently amended) The ~~gel matrix~~system of claim 113, wherein the SERS-enhancing nanoparticles comprise one or more Raman-active tags independently selected from the group consisting of nucleic acids, nucleotides, nucleotide analogs, base analogs, fluorescent dyes, peptides, amino acids, modified amino acids, organic moieties, quantum dots, carbon nanotubes, fullerenes, metal nanoparticles, electron dense particles and crystalline particles.

115. (Currently amended) The ~~gel matrix~~system of claim 96, wherein at least one of the nanoparticles has a net charge.

116. (Currently amended) The ~~gel matrix~~ system of claim 96, wherein the nanoparticles each provide a unique SERS-signal that is correlated with binding specificity of the probe of the nanoparticle.

117. (Currently amended) The ~~gel matrix~~system of claim 96, wherein the Raman-active tag comprises adenine or an analog thereof.

118. (Currently amended) The ~~gel matrix~~system of claim 96, wherein the probe is selected from antibodies, antigens, polynucleotides, oligonucleotides, receptors and ligands.

119. (Currently amended) The ~~gel matrix~~system of claim 118, wherein the probe comprises a polynucleotide.

120. (Currently amended) The ~~gel matrix~~system of claim 96, wherein any of the nanoparticles may further comprise a fluorescent label that contributes to the optical signature.

121. (New) The gel matrix of claim 2, wherein each of the plurality of nanoparticles comprises a unique optically active polynucleotide barcode.

122. (New) The system of 97, wherein each of the plurality of nanoparticles comprises a unique optically active polynucleotide barcode.

123. (New) A gel matrix comprising gel comprising pores having a size to sieve molecules of a desired size range by electrophoresis and one or more SERS-enhancing nanoparticles with an attached probe configured to bind to a predetermined analyte within the gel,

wherein the gel matrix has a thickness sufficient to perform electrophoresis.

124. (New) The gel matrix of claim 123, comprising a plurality of the nanoparticles to provide a plurality of unique optical signatures.

125. (New) The gel matrix of claim 124, wherein each of the plurality of nanoparticles comprises a unique optically active polynucleotide barcode.

126. (New) The gel matrix of claim 124, wherein the plurality of nanoparticles comprises different probes configured to bind to different analytes.

127. (New) The gel matrix of claim 126, wherein the different analytes and the plurality of nanoparticles form analyte-nanoparticles complexes and a separation due to electrophoresis depends on net differences between charge and weight between analyte-nanoparticles complexes.